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ABSTRACT

This study is concerned with the relative amount of overlap or duplication existing between the first two years of the liberal arts college and the last two years of secondary school in the areas of English, science, social studies, and mathematics. Financial problems and other valid areas for concern are also explored: 1) How valid may repetition be? 2) Who decides what content to repeat? 3) What is the purpose of duplication at college level? 4) Are instructors aware of curriculum content across levels? The general plan was twofold: 1) to enable 665 high school teachers of grades 11 and 12 to examine sample outlines of courses taught during the first two years of college; and, 2) to enable 400 college instructors to review high school level subjects in these four areas as taught in grades 11 and 12. In response, high school teachers felt that almost one-third of content of all four areas of the college curriculum seems to be nothing more than high school courses rearranged and offered under a new name. The data from the college instructors are somewhat similar relative to the subject matter, both groups ranking in this order: highest duplication in social science, followed by English, science, mathematics. A chi-square of evaluators some two months after they completed initial ratings reveals their judgments can be considered statistically significant. Tables and graphs are included, and various recommendations are made to promote better coordination and articulation. (Author/JSB)

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- A NATIONAL SURVEY -

CURRICULUM ARTICULATION

BETWEEN

THE COLLEGE OF LIBERAL ARTS

AND

THE SECONDARY SCHOOL

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SECOND INTERIM REPORT

GRADUATE PROGRAMS OFFICE

SPRING QUARTER, 1971

A NATIONAL SURVEY: CURRICULUM ARTICULATION BETWEEN THE COLLEGE OF LIBERAL ARTS AND THE SECONDARY SCHOOL

Introduction

The name by which an institution is known is not always a trustworthy index of the level at which it renders service. There are some colleges and universities which are nothing more than mediocre high schools. The charter granted an institution should not be taken at face value. Regional and/ or state accreditation are not always credible.

If one is concerned with higher education in terms of objectives, a little probing indicates that the objectives of higher education do not differ significantly in many instances from those educational objectives utilized in secondary education. Or, one might be interested in defining higher education in terms of methods of instruction or methods of study, however, it may be noted that here again, higher education does not differ sharply in these respects from other levels of education.

In this brief report, higher education is defined as that level of education, which lies beyond the completion of the high school. We are concerned basically with the liberal arts college; this is typically an institution offering the Bachelor's degree on the basis of a four-year program beyond the completion of high school. A few of the stronger

liberal arts colleges also offer a fifth year of work leading to the Master's degree in some subject-matter fields.

Review of the Literature

We have been schooled on catalogue prose that describes a list of educational aims and then assures its clientele that these aims are regularly accomplished by the faculty, having first been laid down by the administration and approved by the board of trustees. Meanwhile, the supporting evidence of such accomplishment remains thin.[1]

Two important books published in the first part of 1968 - - - The Higher Learning in America: A Reassessment[2] by Paul Woodring, and The Academic Revolution[3] by Jencks and Riesman, make the point that, whereas faculty devaluation of undergraduate teaching, particularly of courses in liberal education, has been a major factor in student disaffection, students tend to blame the administration and not the professors for their feelings of alienation.

Benezet believes[4] that chief among the things that have not changed in the American college are the methods of teaching liberal education. The testimony of Julian Ross speaks for the liberal arts colleges everywhere:

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[1] Benezet, Louis T. "Continuity and Change: The Need for Both," The Future Academic Community. Edited by John Caffrey, American Council on Education, Washington, D. C., 1969, p. 17.

[2] New York: McGraw-Hill Book Company.

[3] Garden City, N.Y.: Doubleday and Company.

[4] Op. Cit., p. 24.

> Though the liberal arts curriculum has passed through a cycle of changes, such as the rise and decline of general education courses, it is now very similar to what it was in 1925. Both then and now it included requirements in foreign language, laboratory science, a series of distribution courses, and a thirty hour major.

The role of general education has experienced numerous interpretations. For example, Cowley (1960) cited the belief in some quarters that general education properly belongs in secondary schools. He cited the disinterest of a substantial portion of faculty members, the dominant status of the research function, and the present major system as tending to emphasize special rather than general education.[5]

De Vane (1964) noting the trends toward early and narrow specialization as more students press toward graduate and professional schools, expressed concern that the widespread advanced placement movement may sacrifice the cohesive effect of the common curriculum in the early years of college. However, to the extent that secondary schools relieve colleges of basic studies such as English composition, calculus, and foreign language, De Vane stated, advanced placement had merit.[6]

In a study restricted to catalogued documentation of 28 liberal arts colleges, Rudy (1960) found a trend in which general education was confined in varying degrees to the first two years, followed by

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[5] Cowley, W. H. "Three Curricular Conflicts." Liberal Education 46: 467-83; December 1960.

[6] De Vane, William C. "A Time and a Place for Liberal Education." Liberal Education 50: 198-212; May 1964.

specialized and even professional training. Reflecting this emphasis, faculties were organized on the basis of specialized department areas of scholarly and professional interest. In only a few nationally renowned liberal arts colleges and Catholic colleges was the trend less sweeping. St. John's College, Annapolis, Maryland, represents a case having little influence on the main line of development.[7]

McGrath (1961, 1963a) studied the curricula of 14 independent liberal arts colleges and the related costs of instruction. He found that subject matter splintering and course proliferation produced not only a meager body of undergraduate common instruction but also many courses of a postgraduate character with few students and an overworked and underpaid faculty.[8, 9]

Brinker (1960) studied courses taken by liberal arts students in four liberal arts colleges of the Southeast to validate the presumption that a well educated liberal arts graduate should have at least an acquaintance with humanities, social sciences, and natural science. The study found that humanities and science majors failed to obtain an elementary acquaintance with disciplines in other fields and that graduates of three of the colleges concentrated in their majors,

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[7] Rudy, Willis. The Evolving Liberal Arts Curriculum: A Historical Review of Basic Themes. Publications of the Institute of Higher Education. New York: Bureau of Publications, Teachers College, Columbia University, 1960. 135 pp.

[8] McGrath, Earl J. Memo to a College Faculty Member. Publication of the Institute of Higher Education. New York: Bureau of Publications, Teachers College, Columbia University, 1961. 54 pp.

[9] McGrath, Earl J. "The College Curriculum - An Academic Wasteland?" Liberal Education 49: 235-50; May 1963a.

sacrificing breadth for depth. There is some evidence that advisers were motivated to enhance the prestige of their own Departments rather than to see merit in other disciplines.[10]

The place and the nature of general education remains unsettled and articulation with secondary schools is a renewed concern. Faculty responsibilities in curriculum planning and development do not appear to have reached any amicable agreement. The need for more constructive definitive research is a perennial one, especially in the area of curricula for higher education. It would seem that the increasing tempo of change should bring with it commensurate attention to experimentation and research as necessary to direct such change.

Evidence of faulty articulation in our educational system exists when there is overlapping of subject-matter content at various levels. One of the earlier studies which displays inco-ordination of this type is that of Osburn.[11] His investigation sought to determine the extent to which the subject-matter at one level of the educational system is the same as that at another level. His results show that 17 per cent of the course in high-school physics is repeated in college. One-fifth of the high-school English course is presented earlier in the elementary schools and one-tenth of it is presented over again in the college unit.

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[10] Brinker, Paul A. "Our Illiberal Liberal-Arts Colleges: The Dangers of Undergraduate Overspecialization." Journal of Higher Education 31: 133-38; March 1960.

[11] Osburn, W. J. Overlapping and Omissions in Our Courses of Study. Bloomington, Illinois: Public School Publishing Company, 1928.

Almost 20 per cent of the content of high-school history was found to have been taught in the elementary grades, and almost 23 per cent of it is taught again in college.

A candidate for the Bachelor's degree in college who has specialized in English will probably have studied Shakespeare's "Julius Caeser" some four times during his school program in the elementary grades, high school, and college. Examples of this type of overlapping can readily be multiplied.[12]

Purpose of Study

The basic purpose of this study is to determine the degree of articulation between high school and college level subject-matter. Precisely, the investigator is concerned with the relative amount of overlapping, or duplication as may exist between the first two years of the liberal arts college and the last two years of the secondary school in the areas of English, science, social studies, and mathematics.

Sampling Population

An estimated 269 colleges and universities, or 60 per cent of those listed in the Thirteenth Annual List[13] (effective, September 1, 1966 to August 31, 1967) of the National Council for Accreditation of Teacher Education (NCATE) comprised one of the samples used in this report.

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[12] Russell, John Dale and Judd, Charles H. The American Educational System. Chicago, Illinois: Houghton Mifflin Company, 1940. Pp. 221-22.

[13] National Council for Accreditation of Teacher Education, 13th Annual List, 1966 - 1967, 1750 Pennsylvania Avenue, N.W., Washington, D.C. 20006. Note: The 13th Annual List, 1966 - 1967 contains 449 colleges and universities.

Approximately 400 college faculty members representing these colleges and universities carefully reviewed high school courses in the areas of English, science, social stidies, and mathematics.

Some 800 secondary schools selected at random from the roster of each of the six regional accreditation associations were invited to participate in this study. Of the 800, some 65 per cent, or 520 high schools representing some forty-one states thus became the second sample utilized in this study. Also representing these high schools were 665 full-time faculty members who carefully evaluated liberal arts courses in the areas of English, science, social studies, and mathematics.

All college and high school teachers possessed as a minimal requirement to evaluate courses - a Master's degree in one of four areas of specialization, namely, English, science, social studies, and mathematics. All instructors rated courses ONLY in their major area of teaching. All 1,065 college and high school teachers had to have at least four years of satisfactory teaching experience in order to participate in this study.

The sampling population, 269 colleges and universities and 520 secondary schools were contacted during 1965-66. The first contacts were made in January, 1965 through the use of opinionnaires.

Procedure

The general plan for this study was twofold, namely: (1) To enable 665 high school teachers of grades 11 and 12 the opportunity

to examine sample outlines of courses ordinarily taught during the first two years of college in the areas of English, science, social studies, and mathematics and (2) To enable 400 college instructors the occasion to review high school level subjects as taught in grades 11 and 12 and specifically in the areas of English, science, social studies, and mathematics. In each area examined, both high school and college instructors reviewed the purpose, educational objectives, and a brief resume of the content of each course.

Of the 665 high school teachers, 160 evaluated 25 college English courses; 180 reviewed 25 social science courses; 150 analyzed 25 courses in mathematics, and 175 examined 30 college science courses. Some 105 college level courses were thus evaluated by secondary school teachers.

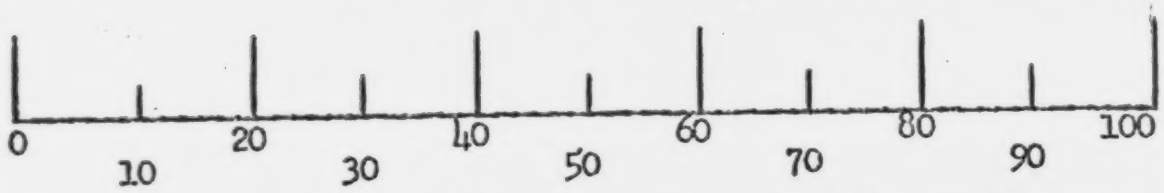
Of the 400 college faculty, 100 evaluated 25 high school English courses; 90 instructors examined 25 science courses; 110 faculty members analyzed 25 mathematic courses, and the remaining 100 college instructors reviewed 30 social science courses. The total number of courses subject to examination by college personnel numbered 105.

Arrangements included sending an opinionnaire to all participants which included courses of study. Teachers were asked the following:

IN REVIEWING THE COURSE OF STUDY, CAN YOU FIND ANY DEGREE OF REPETITION AS MAY BE RELATED TO THE COURSE (s) YOU TEACH?

All teachers used the following rating scale to judge the degree of repetition, if any, in the subject matter:

(PER CENT OF REPETITION)



Note: If repetition is discerned, place a check mark (x) on the line above in the rating scale which may represent your opinion at this time.

Treatment of Data

The following tables at this point represent what the high school teachers thought of college level courses as far as repetition was concerned. For example, Table 1 indicates that the 160 high school

Table 1. - High School Teachers Rate Degree of Repetition of College Level Courses Compared to Secondary School Courses

Area and Course	Number of Teachers Reporting (N = 160)	Number of Courses	Per Cent of Duplication		Standard Deviation (Sigma)
			Range	Mean	
English					
Fundamentals of Speech	36	5	15-36	27.83	2.81
English Composition	32	5	20-63	42.74	3.16
Appreciation of Poetry	28	5	18-54	38.41	2.73
English Literature	30	5	20-52	38.25	2.58
Advanced Creative Writing	34	5	14-45	31.36	2.44
Combining all subjects, Mean =				35.37	2.74

teachers have estimated that slightly more than one-third (35.37%) of the content of English courses taught at the college level repeat what has already been taught at the high school level. For example, nearly 28 per cent of the content of the college level course named Fundamentals of Speech is initially taught in high school; about 43 per cent of the content of English Composition taught at the college level is merely a repeat of what the student has already tackled in high school; 38 per cent of the content of Appreciation of Poetry is previously taught at the secondary level; 38 per cent of the content of English Literature has already been taught at the high school level and finally, 31 per cent of the content of the college course called Advanced Creative Writing represents a duplication of the content taught at the secondary level.

Table 1 appears to indicate that slightly more than one-third (35.37%) of the content of college English surveyed in this report is nothing more than a duplication of high school course work. Do these results indicate a statistically significant trend of opinion? To answer this question, all 160 high school teachers were asked to express their attitude toward the proposition: DO YOU BELIEVE THAT THE RATINGS YOU PREVIOUSLY MADE OF COLLEGE ENGLISH COURSES REFLECTS YOUR ATTITUDE WHICH WOULD PREVAIL TODAY? Teachers were queried to underline one of the following:

STRONGLY APPROVE-APPROVE-INDIFFERENT-DISAPPROVE-STRONGLY DISAPPROVE

The time lapse between the initial ratings and this follow-up study was 60 days. This design was adhered to so that data might be treated statistically using chi-square. With 4 df's and P's of 9.68 to 11.84 at the .05 and less levels, our chi-square test tends to show that our five groups of secondary school teachers really favor the proposition, hence their initial ratings may be stated to reflect a "statistically significant trend of opinion."

The results in English obtained in this report appear to confirm some earlier conclusions of a National Conference which was supported by the Cooperative Research Program of the United States Office of Education, and cosponsored by the National Council of Teachers of English. For example:

> Fundamental changes in school English courses appear certain during the next few years. The two-year colleges, many of them connected administratively with the public schools, ought theoretically at least to be in closer touch with the reform movement than the four-year colleges and universities and able to profit from it sooner. And in fact, whether they wish it or not, the two-year colleges, and the others as well, will sooner or later find themselves obliged to revise their English programs in the freshman and sophomore years because of these pressures from below, as they are already being forced to modify their mathematics programs.[14]

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[14] Archer, Jerome W., and Ferrell, Wilfred A. Research and the Development of English Programs in the Junior College. Cooperative Research Project No. X-004, National Council of Teachers of English, 1965, 508 South Sixth Street, Champaign, Illinois 61822. Page 2.

It would be sensible to assess these reforms while there is still time, discover the ways and the degree to which they bear on later instruction, then make those changes that seem desirable. It is clearly better to plan intelligently for change than to be forced into it tardily and without foresight.[15]

Table 2 presents the results of the high school teachers evaluating the content of college level social science courses. The

Table 2. - High School Teachers Rate Degree of Repetition of College Level Courses Compared to Secondary School Courses

Area and Course	Number of Teachers Reporting (N = 180)	Number of Courses	Per Cent of Duplication		Standard Deviation (Sigma)
			Range	Mean	
Social Science					
The U.S. to 1865	40	5	25-60	45.63	3.47
The U.S. Since 1865	33	5	20-50	37.81	3.09
Civil War and Reconstruction	35	5	15-55	38.25	3.31
Sociology	34	5	20-57	40.16	3.52
Psychology	38	5	17-45	34.37	2.78
Combining all subjects, Mean =				39.35	3.23

[15] Ibid., pp. 2 and 3.

reader may note that slightly more than one-third (39.35%) of the content of the college social studies has already been taught in high school.

The U.S. to 1865 as taught in college duplicates roughly 46 per cent of the subject matter taught in high school; The U.S. Since 1865 college level course repeats some 38 per cent previously presented the student at the secondary level; Civil War and Reconstruction is repeated some 38 per cent; Sociology is duplicated at 40 per cent and Psychology is reiterated 34 per cent.

Again, the writer was interested in discerning whether or not, these results might indicate a statistical significant trend of opinion. Following the same procedure employed in English, the social science teachers (N = 180) were administered the chi-square test using the earlier proposition stated for English personnel and levels of significance were at .05 and less thus indicating that the trend of thinking of these teachers was statistically significant.

Table 3, which follows, affords us the opportunity to review what some 175 high school teachers think of the content of science courses as taught at the college level and whether or not, this content is already presented at the high school level.

In reviewing Table 3, we find duplication for all courses reviewed by the secondary school teachers. Biology appears to lead the parade with some 29 per cent of the content already covered by the secondary school; Physics ranks second in repetition with 27 per

cent; Botany ranks third with a 23 per cent; Chemistry ranks fourth at 22 per cent and Geology ranks last with 18 per cent of repetition.

If we combine all science subjects evaluated by the high school teachers, we find roughly 24 per cent of the content duplicates what is already taught at the high school level.

Table 3. - High School Teachers Rate Degree of Repetition of College Level Courses Compared to Secondary School Courses

Area and Course	Number of Teachers Reporting (N = 175)	Number of Courses	Per Cent of Duplication Range	Mean	Standard Deviation (Sigma)
Science					
Physics	35	6	15-35	27.34	2.71
Chemistry	30	6	10-28	22.56	1.83
Biology	37	6	14-43	29.28	3.14
Geology	34	6	10-24	18.31	1.69
Botany	39	6	10-32	23.47	1.25
Combining all subjects, Mean =				24.31	2.12

A chi-square test of the science teachers revealed levels of significance of .05 and less. Using the same proposition posed earlier for English teachers, we may regard the ratings by the high school science teachers as indicating a statistically significant trend of opinion.

Reviewing Table 4 in the area of mathematics, one may note that the content of college Algebra is a repeat by the college of approximately 34 per cent of what has already been presented at the high school level; college Geometry duplicates about 28 per cent of what is taught in the curriculum of the secondary school; Plane Trigonometry is repeated some 18 per cent; Elementary Statistics overlaps some 17 per cent with high school level content and Calculus I is a duplicate of roughly 13 per cent.

Table 4. - High School Teachers Rate Degree of Repetition of College Level Courses Compared to Secondary School Courses

Area and Course	Number of Teachers Reporting (N = 150)	Number of Courses	Per Cent of Duplication Range	Per Cent of Duplication Mean	Standard Deviation (Sigma)
Mathematics:					
Algebra	25	5	18-46	34.51	3.52
Geometry	35	5	15-37	27.63	2.41
Elementary Statistics ...	30	5	8-22	17.42	1.79
Plane Trigonometry .	24	5	10-25	18.97	1.94
Calculus I	36	5	5-20	13.25	2.08
Combining all subjects, Mean =				21.90	2.35

If we combine the courses in mathematics, we find that slightly more than one-fifth, or 22 per cent of the content taught at the college level has already been covered at the high school.

A chi-square test of the 150 teachers of mathematics indicates .05 levels and less thus pointing to a statistically significant trend of opinion.

Table 5 presents a summary of what we have achieved thus far.

Table 5. - Summary: Rank Order of College Repetition of High School Courses

Course: Rank Order	Number of Teachers Reporting (N = 665)	Number of Courses	Per Cent of Duplication		Standard Deviation (Sigma)
			Range	Mean	
1. Social Science	180	25	15-60	39.35	3.23
2. English	160	25	14-63	35.37	2.74
3. Science	175	36	10-43	24.31	2.12
4. Mathematics	150	25	5-46	21.90	2.35
Combining all subjects, Mean =				30.49	2.62

Reviewing Table 5, we find that colleges and universities are repeating slightly more than one-third, or 39 per cent of the content in social science courses which the college student has already been exposed to on the secondary level. The social science area apparently

leads the parade as far as overlapping with high school courses. Next, in order of repetition, we find English at 35 per cent; Science at 24 per cent and last, Mathematics at 22 per cent.

Combining all areas investigated, almost one-third, or 30 per cent of the content of all four areas of the college curriculum seem to be nothing more than high school courses re-arranged into a college course and then offered under a new name, but unmistakably continuing as high school substance.

If we can assume that are our findings are correct, that is, that nearly one-third, or 30 per cent of the content of college level courses are merely duplicates of secondary school subjects, we may look at this matter from another very important viewpoint - the financial status of the "duplicate student."

In the Fall of 1965, the number of enrollees in institutions of higher education totaled 3,999,940 and 1,967,471 for public and privately controlled institutions, respectively.[16] Tuition and required fees for the same period amounted to $222 and $831 for public and privately controlled institutions, respectively.[17] If nearly one-third of the content of subject matter taken during the first two years of college is merely a repetition of what the high school has already presented, an estimated 2,983,705 freshmen and sophomores enrolled in public and private institutions of higher education are paying tuition and required fees of $420,492,375 for course content that the student's

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[16] Standard Education Almanac. Alvin Renetzky, Editor-in-Chief. Los Angeles, California: Academia Media, Inc., 1968, p. 286.

[17] Ibid., p. 283.

parents have already reimbursed the state during youths' secondary education role. Today, the academic year of 1970-71 finds an increased enrollment in public and private institutions of higher education as well as increased tuition fees as compared with the school session of 1965-66. Therefore, the sum of $420,492,375 may be considered but a minimal expenditure ALL parents WILL continue to pay for overlapping of subject matter on the collegiate level. Does this represent prudent economy in administering the programs in higher education in this country?

Several questions at this point are susceptible to close inspection and examination. For example:

1. Undoubtedly, some repetition of college subject-matter as related to the high school may be completely desirable and most welcome. The point is, WHO decides WHAT content of the secondary school should be repeated? If repetition is desirable, on what level should it begin and in what areas of the college curriculum? Is repetition based on students' needs and interests, or upon the college's aims and goals? How VALID and RELIABLE may the repetitious material be on the college level?

2. Overlapping of subject-matter should have a specific PURPOSE. What is the BASIC PURPOSE of duplicating subject-matter on the college level when it has already been taught at the high school? If high schools knew the colleges' BASIC PURPOSE, might it not assist high school personnel in providing better guidance and counseling services for high school youth?

3. Is it possible that one of the reasons why duplication of subject-matter exists is because the liberal arts college might be unaware of what is happening curricularwise at the secondary school level?

4. If institutions of higher education repeat what has been taught at the high school level, can this subject-matter be seriously labeled college subject-matter?

5. If colleges and universities throughout the country are using nearly one-third of the content of English, science, social studies, and mathematics as taught on the secondary school level, should these institutions continue to be called colleges and universities?

6. The American Association of Colleges for Teacher Education has cited: It is no overstatement that teacher preparation institutions are willing to certify persons prepared to teach who have but a small amount of knowledge and even less commitment to scholarly endeavor.[18] Since the college of liberal arts shares one-half the education of the prospective teacher, should not they also share this indictment of the American Association of Colleges for Teacher Education along with Schools of Education?

7. It is apparent from the results of this study that administrators and faculties of higher education and our secondary schools do NOT have a common understanding with respect to the goals to be sought in teaching.

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[18] Phi Delta Kappan. Volume L, Number 9, May 1969, p. 547.

8. Boards of Higher Education in the United States should trigger research activities in institutions of higher education so that both groups might be able to render enhanced commitments to educational functions of the state and nation which is based on reliable and factual bases of information.

College Personnel Evaluations

The first section of this report was devoted to reviewing the results of having high school teachers evaluate college level work taught during the first two years of college. This section of the study will find college instructors reviewing high school courses.

Table 6. - College Instructors Evaluate High School Courses to Ascertain Possible Repetition as to Their College Courses

Area and Course	Number of Teachers Reporting (N = 100)	Number of Courses	Per Cent of Duplication		Standard Deviation (Sigma)
			Range	Mean	
English					
English Literature	20	5	15-30	23.49	1.83
American Literature	20	5	10-25	18.06	1.97
Fundamentals of Speech	20	5	12-36	25.17	2.26
Journalism	20	5	10-40	27.58	2.84
Advanced Creative Writing	20	5	8-32	23.74	3.15
Combining all subjects, Mean =				23.61	2.41

taught during the last two years of high school (grades 11 and 12). Is it possible that college personnel may react somewhat in the same manner as high school instructors?

Reviewing Table 6, we find that 28 per cent of the content of Journalism taught in high school is repeated again in college; 25 per cent of the content of Fundamentals of Speech taught at the secondary level is duplicated later in college; some 23 per cent of the content of English Literature overlaps in later college teaching; 24 per cent of the content of Advanced Creative Writing reappears later at the college level and finally, an estimated 18 per cent of the content of American Literature is taught again at the college level.

By combining all English subjects, we find roughly 24 per cent of the content of such courses being reiterated later during the first two years of college.

A chi-square test of the 100 college teachers 60 days later asking these teachers to express their attitude toward the proposition: DO YOU BELIEVE THAT THE RATINGS YOU PREVIOUSLY MADE OF _____ COURSES REFLECTS YOUR ATTITUDE WHICH WOULD PREVAIL TODAY? Teachers were queried to underline one of the following:

STRONGLY APPROVE-APPROVE-INDIFFERENT-DISAPPROVE-STRONGLY DISAPPROVE

Chi-square indicated .05 and less levels of significance thus indicating that the attitude expressed by these faculty members toward repetition of English can be considered a statistically significant trend of opinion.

Table 7 appears to indicate that 29 per cent of the content of Problems of American Democracy taught in high school is later duplicated at the college; 29 per cent of the content of high school Psychology later reappears in college class work; 26 per cent of the content of U.S. History is duplicated later at college; 20 per cent of Sociology overlaps in college classes and finally, we find about 18 per cent of the content of World History is duplicated later in college.

By combining all Social Science courses, we find that nearly a quarter, or 24 per cent of the content of high school courses appears to be a regular inclusion on the college curriculum.

The chi-square test of 100 teachers indicated levels of significance at .05 and less thus pointing to the fact that the opinions earlier rendered by these college instructors appears to indicate a statistically significant trend of opinion.

In reviewing Table 8 which covers Science instruction at the secondary school level, one may note that 32 per cent of the content of Chemistry is repeated again in college level courses; 28 per cent of the content of Physics is later duplicated in college courses; about 24 per cent of the content of Biology is reiterated at the college level; 18 per cent of the content of Botany is reproduced later in college teaching and lastly, an estimated 14 per cent of the content of Geology reappears later in college courses.

By combining all Science courses as taught on the high school level (N = 25), we find that an estimated 23 per cent of the content of

these courses are duplicated at the college level according to the college raters.

Table 8. - College Instructors Evaluate High School Courses to Ascertain Possible Repetition as to Their College Courses

Area and Course	Number of Teachers Reporting (N = 90)	Number of Courses	Per Cent of Duplication Range	Per Cent of Duplication Mean	Standard Deviation (Sigma)
Science					
Physics (PSSC)[1]	20	5	10-40	27.58	3.42
Chemistry (CHEM STUDY)[2] .	20	5	15-45	32.41	3.61
Biology (BSCS)[3]	15	5	10-35	24.35	2.53
Geology	18	5	5-20	13.69	1.79
Botany	17	5	5-25	17.72	2.35
Combing all subjects, Mean =				23.47	2.74

[1] PSSC: The Physical Science Study Committee started in 1956. Stresses the method on inquiry, uses laboratory work to enable students to work through experiments and make their own observations and conclusions.

[2] CHEM STUDY: Initiated in 1960 and extends prime importance to laboratory work. Students are taught to make their own discoveries, observations, and deductions.

[3] BSCS: Launched in 1959 and emphasizes three separate versions of the biological sciences, namely: the blue version, reportedly the most difficult, emphasizes biochemistry and physiology; the yellow version centers on genetics and the development of organisms and the green version focuses on evolution and ecology.

Do these results indicate a statistically significant trend of opinion? According to the chi-square test, levels of significance of .05 and less are noted. Thus, the opinions of these raters may be regarded as statistically significant.

Table 9 indicates that some 17 per cent of the content of

Table 9. - College Instructors Evaluate High School Courses to Ascertain Possible Repetition as to Their College Courses

Area and Course	Number of Teachers Reporting (N = 110)	Number of Courses	Per Cent of Duplication Range	Mean	Standard Deviation (Sigma)
Mathematics:					
UICSM[1]	25	5	10-35	24.51	2.84
SMSG[2]	20	5	5-40	25.63	3.13
Elementary Statistics ..	20	5	10-25	19.84	1.75
Calculus I	20	5	10-30	22.37	2.98
Plane Trigonometry.	25	5	5-28	17.45	3.26
Combining all subjects, Mean =				21.87	2.79

[1] UICSM: The University of Illinois Committee on Mathematics. Mathematical induction, sequences; elementary functions - powers, exponentials, and logarithms; circular functions and trigonometry; polynomial functions and complex numbers.

[2] SMSG: The School Mathematics Study Group. Grade 11, Intermediate Mathematics and Grade 12, Elementary Functions.

Plane Trigonometry taught in high school is later repeated in college; 24 per cent of the content of UICSM reappears later in college; some 26 per cent of SMSG as taught in the secondary school is duplicated later in college; 22 per cent of the content of Calculus I as taught in high school is later repeated in college and finally, some 20 per cent of Elementary Statistics content taught in high school is repeated in college.

Table 10 presents a summary of the four areas of high school subject-matter as reviewed by college personnel:

Table 10. - Summary: Rank Order of High School Repetition of College Level Courses

Course: Rank Order	Number of Teachers Reporting (N = 400)	Number of Courses	Per Cent of Duplication Range	Per Cent of Duplication Mean	Standard Deviation (Sigma)
1. Social Science .	100	30	5-45	24.48	2.58
2. English	100	25	8-40	23.61	2.41
3. Science	90	25	5-45	23.47	2.74
4. Mathematics	110	25	5-40	21.87	2.79
Combining all subjects, Mean =				23.32	2.63

In reviewing Table 10, one may note that an estimated 23 per cent of the combined subjects already presented at the secondary school level

undergoes repetition later at the college level.

It is indeed interesting to note that both Tables 5 and 10 indicate the rank order of subject-matter to be identical. Both high school instructors and college personnel rank Social Science subjects top priority as far as overlapping is concerned. Mathematics ranks last as compared with the other three disciplines.

Relationship between High School and College Evaluations

Since we have found a noticeable tendency for high school and college teachers to think somewhat similar relative to the subject-matter areas being duplicated on both levels, what might the coefficient of correlation reveal if we compare the ratings of both groups. Table 11

Table 11. - Relationship between High School and College Personnel Pertaining to Evaluating Subject-Matter

Area	N	r*	Standard Deviation	Level of Significance
English	100	.79	3.47	< .001
Science	90	.75	2.91	< .001
Social Science	100	.73	3.20	< .001
Mathematics	110	.68	2.65	< .001

*Mean r = (.74) using Fischer's z coefficient.

provides us with some idea of the strength of this relationship.

Table 11 indicates that the coefficients of correlation (Pearson r) extend from .68 to .79 with a mean r of .74. This .74 tends to suggest a moderately high relationship between the high school and college raters. And, this particular coefficient of correlation is significant at the .001 level which permits us to assume that the results achieved in this bi-evaluation did not occur by chance alone.

Conclusions

1. If one compares the subjects (English, science, social studies, and mathematics) as taught on the college level during the first two years with comparable courses taught in the high school the last two years (grades 11 and 12), the degree of duplication is found to be a mean of 30.49 $\pm$ 2.63 per cent.

2. If one compares the subjects (English, science, social studies, and mathematics) as taught in high school (grades 11 and 12) with similar college level courses taught during the freshmen and sophomore years, repetition is found to possess a mean of 23.32 $\pm$ 2.63 per cent.

3. The mean per cent of duplication at the college level in rank order of importance shows Social Science the highest (39.35%); English (35.37%); Science (24.31%), and Mathematics (21.90%).

4. A chi-square of high school teachers (N = 665) some two months after rating college courses indicates that their evaluations can be considered a "statistically significant trend of opinion."

5. The mean per cent of overlapping at the high school level in rank order of importance shows Social Science the highest (24.48%); English (23.61%); Science (23.47%), and Mathematics (21.87%).

6. A chi-square of college instructors (N = 400) evaluating high school English, Social Studies, Science, and Mathematics courses some two months after they completed their initial ratings of these courses reveals that their initial judgments can be considered a "statistically significant trend of opinion."

7. In correlating high school teachers' ratings with college personnel ratings as related to duplication of subject-matter, we find English ranking the highest with an r of .79, Science with an r of .75, Social Science with an r of .73, and Mathematics revealing an r of .68. If we combine all subjects, our mean becomes an r of .74 which is significant at the $<.001$ level. Apparently, secondary and college level instructors exhibit a moderately high relationship when evaluating courses of instruction in their specialized areas of competency..

8. The overlapping of courses at both levels, namely high school and college, tends to suggest poor coordination and articulation between colleges of liberal arts and secondary schools throughout the country.

9. Since nearly one-third of the content of college teaching during the first two years represents a reiteration of what has already been taught at the secondary level, may this repetitive teaching actually

be thwarting potential accomplishments in other areas of the curriculum? Since our knowledge is expanding at a tremendous rate each year, can colleges afford to engage in this repetitive teaching technique? There are approximately 2100 institutions of higher learning of which more than 1500 prepare biology teachers that are certified to teach in secondary schools, yet most are not preparing biology teachers adequately, both in terms of biological concepts and in the process of science.[19]

10. The duplication of high school subject-matter at the college level cost students an estimated $420,492,375 for the 1965-66 academic session. Is this expenditure commensurate with what the college of liberal arts calls quality teaching? As a brief reminder, the parents of these college youth have already reimbursed the high schools in all states for the subject-matter duplicated at the college level. Is this repeat performance actually satisfying the GOALS of higher education? What documentary evidence do colleges of liberal arts possess to substantiate this repetitive teaching?

Recommendations:

1. Colleges of liberal arts should cooperatively address themselves to the secondary schools of this country relative to: How best may we work together to provide better sequence and articulation of courses of study?

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[19] The Pre-Service Preparation of Secondary School Biology Teachers. Addison E. Lee, Editor. Publication 25, Commission on Undergraduate Education in the Biological Sciences (CUEBS). Supported by a grant from the National Science Foundation to George Washington University, 1969, p. 3.

2. Colleges of liberal arts should offer, at times convenient for college and secondary school personnel, opportunities consisting of seminars, workshops, conferences, inter-school visitation in order to aid and abet planning, development, analysis, and interpretation of curricular offerings in the hope that continuous and comprehensive evaluation will benefit the youth attending these schools.

3. State Departments of Education should provide guidelines to colleges and universities as to HOW both levels might coordinate their services. Appropiate consultant assistance should also be available from State Departments of Education. This level is particularly weak at the present and needs to be strengthened.

4. The basic reason for the existence of administration is to facilitate instruction. Educational leadership at both the high school and college level may be seriously questioned. Professional improvement of administrators needs to be revitalized. Administrators need to stress the inter-disciplinary approach to problems of a curricular nature. No single question is intensified primarily by its own boundaries. The parameter of any problem may balloon into many related disciplines.

5. A nationwide survey and analysis of actual inservice training practices and techniques introducing college and high school teachers and administrators to possible solutions, or ideas on how best to implement articulation of learning experiences should be a basic research proposal.

6. The NCTE, or National Council of Teachers of English and similar Councils for Science, Social Science, and Mathematics should insist and support research of an inter-disciplinary nature and assist in designing potential guideposts for colleges and secondary schools so that both levels may work together in joint-action as to what direction they might pursue best. Currently, both groups are comparable to a ship at sea without a rudder - just floundering!

7. Colleges of liberal arts need to reassess their testing programs. The need for appraising the educational growth of youth is vitally important. Testing in college needs to place more emphasis on the diagnostic ends; WHY did the student respond the way he did? These schools additionally need instruments of a predictive nature based on the curriculum coming under the colleges' control. The work - study - skills - habits - attitudes and appreciations of college youth should receive more attention; these, after all, are the FOUNDATION factors in all general learning situations.

8. The liberal arts college is currently being affected by two forces, namely: (1) The rapid development of the public community college which has already siphoned a large number of students who, it is presumed, would otherwise have enrolled in the liberal arts college. If this practice continues, the liberal arts college may have to limit its current four-year program to a two-year program beginning with the third year. And (2) The graduate professional schools are in the process of a downward extension and are planning and developing integrated programs of liberal

arts and professional work beginning with the third year of college. If the two upper years become a part of the graduate school and the lower two years are taken over by the community junior college, where does this leave the liberal arts college? It is quite possible that within a period of time, the liberal arts college may become practically nonexistent.